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manifestation of, perhaps, several different causes, one of which is of considerable importance in this country and has been shown to consist in unusual amounts of dissolved air.

The third section is devoted entirely to the crayfish disease, 'Krebspest,' for years past widespread and destructive in Europe, but here unknown. The author and his assistant have made a special research on this subject and have described as the cause of the disease *Bacterium pestis astaci*, which attacks also, causing a general infection, several cyprinoids and allied fishes in the waters of nature as well as in domestication.

The last section consists of a few pages of general directions to the fish culturist with respect to measures to be taken at the onset of disease. In general there is little encouragement to the breeder in the way of remedies. Therapeutics with fishes is not far advanced and the prognosis in the case of the general infections is bad. Some cases of external parasitism may be successfully treated, but the chief reliance must be in prevention. Practical directions are given for the disinfection of ponds and the natural remedy is frequently advised of removing infected trout to rapidly flowing streams.

The book is profusely illustrated with colored plates, drawings and photographs, and to these it owes a large part of its usefulness. The representation in color of the lesions of the bacterial diseases aids their identification, which is rather difficult at best.

M. C. MARSH.

Katalog der Bibliothek der Gesellschaft für Erdkunde zu Berlin. Versuch einer systematik der geographischen Literatur. Von PAUL DINSE. Berlin, Ernst Siegfried Mittler und Sohn. 1903. Pp. xxvii + 925. Price, 12 Marks.

When the Berlin Gesellschaft für Erdkunde moved into its own building the opportunity was given for a rearrangement of its library. The scheme in use had become antiquated and inadequate. To Dr. Dinse was entrusted the preparation of a new plan of arrangement. The results of this work lie before us in this large and in every way satisfactory catalogue, which from its fullness and fine subject classi-

fication has high bibliographic value. The scheme of classification is close and thoroughgoing, yet based largely upon considerations of practical convenience. Two main divisions are adopted: general geographic literature and literature of single regions and the sea. Under the former are the subdivisions: (1) bibliography, (2) history of geography and discovery, (3) history of cartography, (4) methods and education, (5) encyclopedic literature of geography, (6) collections and miscellaneous writings relating to geography, (7) general physical geography, (8) general bio-geography, (9) general anthropo-geography, (10) geography of political and economic history of nations, (11) onomatology and transcription. These are again subdivided and when necessary or desirable re-subdivided, sometimes according to subjects and sometimes by countries. The second main division, literature of single regions, is subdivided by continents and countries, and when the literature pertaining to a country is very extensive, this is again subdivided by subjects. Periodicals are arranged separately by countries.

Among the admirable features the following may be noted. The names of authors, when known, and the titles of books, separates and periodicals are given without abbreviations. When doubt might arise as to where a paper should be placed, it is given in full in the two or more places where it might go. At the end of every entry is given, inconspicuously, the letter and number indication showing the exact location of the work in the library of the Gesellschaft. Under each subdivision the works are arranged in order of publication. An author index with abbreviated title and page reference enhances greatly the usefulness of the work which will prove almost as useful to geographic workers in general as to the members of the Berlin Gesellschaft für Erdkunde.

J. M. NICKLES.

SOCIETIES AND ACADEMIES.

THE CHEMICAL SOCIETY OF WASHINGTON.

THE 151st regular meeting of the Chemical Society of Washington was held on Thursday

evening, May 12, 1904, in the assembly hall of the Cosmos Club.

The first paper on the program, entitled 'Heat of Dissociation Proportional to Atomic Weight,' was presented by Dr. E. A. Hill. The paper was a synopsis of the author's dissertation presented to the Columbian University for the degree of doctor of philosophy.

The second paper on the program, entitled 'The Colloid Theory of Plasticity,' was presented by Allerton S. Cushman. The speaker reviewed briefly the evidence which has already been published by himself and other investigators, which tends to show that the two important useful qualities of clays, viz., plasticity and binding power, are caused by the presence of a certain proportion of colloid particles. To prove this, a large amount of evidence has been collected and artificial clay bodies have actually been synthetically prepared in the laboratory, possessing all the peculiar properties of natural clays.

Experiments were made on the lecture table which showed that the addition of certain reagents, such as tannic acid, alum and ammonia, to a pure kaolin clay profoundly modifies the properties and the relation of the clay body to water. Such reagents have no action on inert crystalline particles, but they do upon colloids, producing various effects, such as coagulations, flocculations and deflocculations. Curiously enough, all these reagents, as was shown by a simple experiment, increase the binding power of clay, either by deflocculation of the colloids already present or by producing reactions involving the formation of new colloids. Acheson has recently claimed and obtained a patent for increasing the binding power of clay by treatment with tannic acid. This process is called the Egyptianizing of clay on the, perhaps, somewhat fanciful theory that it was the tannic acids of the straw infusion rather than the fiber of the straw itself which gave strength to the low binding clays of ancient Egypt. From more recent work it is questionable whether small amounts of ammonia will not produce the desired effect even better than tannic acid at a much less expense, and in so simple a manner that its use can not be restricted by patents.

For the last fifty years occasional investigators have been noticing that clays and soils have the power of absorbing certain ingredients from solutions in which they are soaked, and further, that these absorptions are selective, certain substances being eagerly taken up and others rejected. If the clay is first heated to a certain point it no longer exhibits this power, showing that it is not due to adsorption on the particles. This again is a colloid property, and inorganic colloid precipitates made in the laboratory show the same peculiarity. Clays that have been treated with tannic acid and ammonia will absorb less water than the untreated clays and will, therefore, require less water to bring them to a desired consistency. Thus the danger of shrinkage and cracking on drying out is lessened. Attention was called to the importance of the study of these selective absorptions by clay bodies in the investigations of soil physics.

The third paper on the program was entitled 'Notes on the Methods of Detection of Sesame Oil,' and was presented by L. M. Tolman. A number of imported olive oils were found by the author that gave a marked reaction with the Baudouin or Villerechia reagents.

The substance in these oils giving this reaction can be removed by alcohol so that the purified oil gives no color with these reagents. If Sesame oil is present the reaction is not decreased by this method of purification.

The fourth paper on the program, by Peter Fireman and E. G. Portner, on 'Some Observations on the Dissociation of Chlorides by Means of a Qualitative Test,' was presented by Dr. Fireman.

The last paper on the program for the evening was a 'Note on a Bibliography of Solubilities,' presented by A. Seidell. The author mentioned that the preparation of a bibliography of solutions had been begun about eighteen years ago by a committee appointed by the British Association for the Advancement of Science. This committee reported eight years later (1894) that they had collected all the references to work on solutions published prior to 1874 in the periodicals cata-

logued by the Royal Society. This collection has never been published, the manuscript being still in possession of Professor W. W. J. Nicol, the secretary of the committee. For this reason the author undertook the preparation of a bibliography of solubilities only for the years 1875 to 1903, inclusive, and for its compilation carefully examined the tables of contents or indices of twenty-six chemical journals and in addition gives references to papers contained in a great many other journals. Short abstracts enumerating the chemical substances employed in the work are given for each reference and at the end an indexed list of all chemical compounds which have been employed in solubility investigations is given.

At the conclusion of the formal program for the evening Dr. Wm. H. Seaman, of the Patent Office, exhibited and explained a new form of spirometer (small gasometer) which may be used for testing the lung capacity, analyzing air, measuring gases, etc.

A Correction.—At the request of Dr. Chas. Baskerville the following correction in the report of his lecture contained in the May 13 issue of SCIENCE, page 758, is made. He did not call 'especial attention to the observation that all minerals which have the property of becoming phosphorescent under the action of radium rays contain the element helium,' but that 'those minerals which are known to contain helium and are radio-active give off a gas or emanation when heated, which may be condensed by liquid air and exhibits the same properties of causing Sidal's blende to phosphoresce as do the emanations of radium compounds and thorium dioxide.'

A. SEIDELL,
Secretary.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 587th regular meeting was held on May 21, 1904, Vice-president Day in the chair.

A memorial address on the late Major J. W. Powell was read by Dr. W. H. Dall. A sketch of his life was given and some of his achievements; he was said to be far-seeing, much in advance of his time, as on Indian questions and irrigation; his predominant

characteristics were courage, sympathy and insight.

Professor E. A. Pace, of the Catholic University, then spoke by invitation on 'The Rhythm in Visual Perception.' In the attempt to distinguish between physiological and (possible) physical phenomena the study of threshold phenomena may throw much light. So the fluctuations in the perception of a constant, just visible light have been studied. Various writers have attributed them to the afferent nerve, to the central organ, and to fatigue of the ciliary muscle. The speaker had disproved this last view in 1891 by the use of atropine. Later observers found the periodicity stands in close relation to vaso-motor activity and respiration. The speaker's recent observations, still incomplete, on after-images show that the fluctuations are due to retinal fatigue. The paper was discussed by the audience with reference to its bearings on observations on variable stars, and on the velocity of light by the Fizeau-Cornu method.

Mr. J. F. Hayford, of the Coast and Geodetic Survey, reported on 'A Test of the Transit Micrometer, as a Means of Eliminating Personal Equation.' In this instrument the observer attempts to keep the wire on the star, and the instants when the wire passes certain fixed positions are electrically recorded on the chronograph sheet. The practical result is that in difference-of-longitude work three nights' observations by the new method without change of observers are equal to ten nights with exchange by the old key method.

After some discussion the society adjourned till October 15.

CHARLES K. WEAD,
Secretary.

THE NEW YORK ACADEMY OF SCIENCES.

SECTION OF ASTRONOMY, PHYSICS AND CHEMISTRY.

THE regular meeting of the section was held on May 2 at the American Museum of Natural History. The program consisted of four papers, abstracts of which are as follows: *The Theory of a Double Suspension Pendulum*: R. S. WOODWARD.

Professor Woodward described a double suspension pendulum apparatus for determining the acceleration of gravity and gave a brief outline of the theory of the apparatus. The latter consists of two rectangular bars of brass about twenty kilograms mass each, connected by two steel tapes of equal length in such a way that when one bar is held rigidly horizontal the other bar will be suspended horizontally by the equal and parallel tapes. It was shown that when the suspended bar vibrates longitudinally through small amplitudes its motion is very nearly the same as that of a simple pendulum whose length is equal to that of the tapes. It was shown also how small corrections due to the mass of the tapes and to their rigidity may be applied in order to get from the actual apparatus results in conformity with those of a simple pendulum.

Measurements of the Primary Feathers of Recently Killed Hawks, and their Bearings upon the Problem of Bird Flight: C. C. TROWBRIDGE.

During the spring the author succeeded in obtaining a series of measurements of the primary feathers of the hawk's wings, immediately after the death of the birds, and secured additional proof of his theory that certain birds of prey habitually interlock their primary feathers in flight.

It was found that when hawks are examined immediately after they have been killed there usually appear deep depressions in the edge of the posterior webs of the emarginate primary feathers, where the feathers have been in contact, which are caused by the interlocking of the primaries.

The measurements consisted in determining the width of these depressions at short intervals of time immediately after the death of the hawks. It was found that the depressions gradually disappeared, both in cases where the feathers were found locked and were then unlocked, and in cases where the feathers were found unlocked. Data were thus obtained from which well-defined curves were constructed, showing the recovery of the web of the feathers after the pressure caused by the interlocking feathers was relieved. A number of life-size photographs were taken of the

primary feathers immediately after the hawks were killed and the photographs of the depressions in the feathers when measured by a Repsold measuring machine, gave curves which agreed very well with those obtained by direct measurement. Similar curves were obtained by artificially interlocking the primaries for several hours and then measuring the recovery of the web of the feathers with a micrometer microscope. It was found that artificial locking of the feathers for ten minutes produced very slight or no depressions and locking them for several hours produced depressions only about one half as deep as those found when the hawks were killed. In the latter case they were from 2 to 3.5 millimeters deep, and required from one to five hours to be reduced to twenty per cent. of the original depth, the rate of change of the depth of depression being most rapid at first.

It was concluded from the measurements and photographs that the primary feathers found with the depressions in the web had been interlocked several hours or more previous to the death of the hawks, which were killed while sailing in a strong wind, and that the theory of interlocking of the primaries of the wing in flight had been conclusively confirmed.

The Generation of Electrical Charges by Radium: GEORGE B. PEGRAM.

Dr. Pegram's paper related to the generation of electrical charges by radium, with special reference to the suggestion of Soddy that when the α particles, carrying their positive charge, are expelled from the radium, there is no corresponding negative charge left behind in the mass. A few milligrams of radium bromide were enclosed in a thick lead capsule, which was supported on a quartz rod in an exhausted vessel. Gold leaves attached to this capsule gave no indication of a charge, showing either that there was the usual generation of equal amounts of positive and negative electricity when the α particles are thrown off, if, as has been supposed, the number of α particles is much greater than the number of negatively charged particles, or else that the number of β particles is about equal to the number of α particles. It remains to try a similar experi-

ment with radium bromide which has been recently in solution, and, therefore, sends off few of the β particles.

Bending Moments in Rails, for the Same Superstructure, under Different Types of Locomotives: P. H. DUDLEY.

In previous communications to the academy, the author presented from stremmatograph tests, tabulations of the recorded unit fiber stresses in the base of rails, and their distribution under moving locomotives and cars.

The determination from the unit fiber strains, of the negative and positive bending moments of the rails, due to the passing wheel effects, indicates that for a definite construction of the superstructure of the permanent way, they are independent, partially, of the total load of the locomotive or car, but dependent upon the type of each, in construction of wheel base and wheel spacing, in loading the foundation.

In a series of stremmatograph tests, on the New York Central and Hudson River Railroad, near mile post No. 10, December 23 and 30, 1899, locomotive No. 870, an eight-wheel type of engine, weight 220,000 pounds, drawing the 'Empire State Express' of four cars, weight 430,000 pounds, at speeds of 42 and 44 miles per hour, the average positive bending moments for the engine were 12.40 inch-pounds, per pound of static load, for one rail, constrained by a negative bending moment of 1.88 inch-pounds. •

The average positive bending moments for the entire locomotive were 11.48 inch-pounds, per pound of static load, constrained by a negative bending moment of 1.71 inch-pounds.

On December 30 locomotive No. 2032, a ten-wheel type of engine, with closer wheel spacing, weighing 283,900 pounds, drawing the 'Southwestern Limited' of ten cars weighing 910,000 pounds, at a speed of 40 miles per hour, at the same place as the preceding tests, the positive bending moment for the engine was 10.80 inch-pounds per pound of static load, for one rail, constrained by a negative bending moment of 2.18 inch-pounds—a more favorable result than for the eight-wheel type.

For the entire locomotive, the positive bending moment—for normal tender wheels—was

9.82 inch-pounds, for one rail, constrained by a negative bending moment of 1.90 inch-pounds, indicating a more favorable loading of the foundation. The bending moments of different types of locomotives on the same superstructure are a measure of the relative efficiency of the distribution of their loads to the foundation; while with the same type of engine the relative efficiency of the construction of the superstructure of the permanent way can be measured. These are first bending moments measured in rails under moving locomotives and cars.

Dr. H. G. Pifford exhibited an electrometer specially designed for use in measuring radioactivity and showed the action of the instrument by lantern projection.

C. C. TROWBRIDGE,
Secretary.

DISCUSSION AND CORRESPONDENCE.

APPENDICITIS AND THE RACE.

IN the possible effects upon the race of surgical intervention as a cure for disease we have a curious anomaly; nothing less in fact than the direct contradiction of the general proposition which is at the basis of the law of the survival of the fittest, viz., that what is good for the individual is good for the race. Some have questioned the validity of this so far as its application to certain phases of our social and institutional life is concerned, but I have yet to learn of any serious doubt having been cast upon it in its bearing upon the organic evolution of animal forms under natural conditions. Yet under the artificial condition of the removal of diseased parts in order that the life of the individual may be prolonged we have precisely this. In order to give the discussion concreteness let us consider the possible racial effects of the now common operation for appendicitis. Since the old theory of foreign lodgments—grape stones and the like—in the appendix as the cause of the trouble has been proven false, at least in a vast majority of cases, we are forced to consider appendicitis a disease; an inflammation of a particularly serious nature, yet no more accidental in its origin than are similar congestions in other parts of the body. But